

Remarks

The present invention is directed to compositions which are addition curable, being either photocurable or thermally curable, which exhibit high scratch resistance, and which contain ingredients which can be prepared economically. These objects are achieved by combining a unique, functionalized reinforcing filler bearing unsaturated polymerizable groups, and a copolymerizable unsaturated monomer. In the past, the functionalized fillers have been difficult and uneconomical to prepare, and/or possessed characteristics which thwarted the desired objectives.

Applicants solved this problem by functionalizing -OH group-containing filler particles by reaction with a functionalizing agent having at least one reactive or hydrolyzable group OR¹, of the formula



where, for purposes of simplification, R¹ and R³ are hydrogen or hydrocarbon, R² is a hydrocarbon, C is an ethylenically unsaturated group, and of particular importance, A is O, S, = NR⁴, or = NDC. Each of the various A groups is an electronegative, electron withdrawing group, and this group is separated from the silicon by only a single carbon atom. It is this combination which results in the superior properties and advantageously economical processing of Applicants' invention.

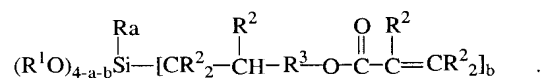
The claims have been rejected under 35 U.S.C. § 102(b) and/or § 103(a) over Olson et al. U.S. Patent 4,491,508 (hereinafter, "*Olson*"). Applicants respectfully traverse these rejections, as *Olson* neither discloses, teaches, or suggests the present invention.

Olson discloses a photocurable mixture which may contain a functionalized silica, but this is far from certain, as *Olson* states in column 5 that the components of his coating composition may be merely mixed together, or his silylacrylate may be hydrolyzed in the

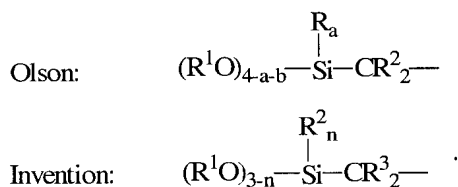
presence of aqueous colloidal silica. Such hydrolysis results in an acrylate-functional silicone resin rather than a functionalized particle. There is no certainty that any reaction with silica silanol groups takes place.

However, even if the silyl acrylate reacts with the silica, the result is not Applicants' invention. In Applicants' invention the reactive silyl compound has the formula stated previously, which does not correspond to, nor is suggested by, *Olson's* silyl acrylate.

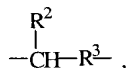
Olson's silyl acrylate has the formula:



See, e.g. column 1 and claim 1. The left hand side of this formula corresponds partially to a portion of Applicants' functionalizer:



However, here the similarity ends, because in Applicants' functionalizers, the methylene group $-CR^3_2-$ must be separated from the remainder of the molecule by an A group, which is a strongly electron withdrawing group. In contrast, in *Olson*, the group which corresponds in position to Applicants' A group is:



a straight chain alkylene group when R^2 is H, or a branched alkylene group when R^2 is alkyl, cycloalkyl, etc. Representative compounds of *Olson* are listed in column 3, lines 31 - 44. Note that in none of these is there an electron withdrawing group containing O, N, or S adjacent to the methylene group.

Olson does not disclose, teach or suggest Applicants' claimed functionalizer molecules nor the functional group which results after reaction with -OH groups of the particles, which necessarily still contain the A group.

In Comparative Example 2, silica is reacted with methacrylatopropyltrimethoxysilane, the same compound disclosed in *Olson* at column 3, line 35. The loss of gloss in a cured composition resulting from use of these functionalized particles was a huge 43%, almost double that of Example 3, which employed the inventive methacrylatomethyltrimethoxysilane. Example 5, where but a single methoxy group was present in the functionalizer methacrylatomethyldimethylmethoxysilane, had even higher scratch resistance, a loss in gloss of less than 5%. As indicated in the specification, under normal circumstances, it would be impossible to use any functionalizer having but a single methoxy group. *See, e.g.* page 2, lines 25 - 33.

Withdrawal of the rejections of the claims under 35 U.S.C.1 § 102(b) and 103(a) is respectfully solicited.

The claims have been rejected for obvious-type double patenting over commonly assigned U.S. patent application 10/599,022. Submitted herewith is a terminal disclaimer over any patent issuing from that application. Withdrawal of the obviousness-type double patenting rejection is therefore respectfully solicited.


S/N: 10/599,285
Reply to Office Action of August 14, 2008

Atty Dkt No. WAS 0807 PUSA

Applicants submit that the claims are now in condition for Allowance, and respectfully request a Notice to that effect. If the Examiner believes that further discussion will advance the prosecution of the Application, the Examiner is highly encouraged to telephone Applicants' attorney at the number given below.

Please charge any fees or credit any overpayments as a result of the filing of this paper to our Deposit Account No. 02-3978.

Respectfully submitted,
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